



## ANTI-INFLAMMATORY ACTIVITY OF THE METHANOLIC EXTRACT OF *BUCHANANIA LANZAN* LEAVES BY CARRAGEENAN-INDUCED RAT PAW OEDEMA METHOD

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### ABSTRACT

The methanolic extract of the leaves of *Buchanania Lanzas* was investigated for its anti inflammatory activity in animal models. The extract at different doses used showed good anti inflammatory activity which has been done significantly, by the formation of oedema induced by carrageenan. These results were also comparable to aspirin, the reference drugs used in this study. The results from present study indicate the efficacy of the methanolic extract as a therapeutic agent in acute as well as chronic inflammatory conditions. Thus it could be concluded that *Buchanania Lanzas* leaves extracts possess significant anti-inflammatory properties.

**Keywords:** Anti-inflammation, *Buchanania Lanzas*, aspirin, rats, toxicity.

### INTRODUCTION

Medicinal herbs have been used as a form of therapy for the relief of pain throughout history. The treatment of rheumatic disorder is an area in which the practitioners of traditional medicine enjoy patronage and success. Natural products in general and medicinal plants in particular, are believed to be an important source of new chemical substances with potential therapeutic efficacy. Taking into account the most important analgesic prototypes (e.g. salicylic acid and morphine) were originally derived from the plant sources, the study of plant species traditionally used as pain killers should still be seen as a fruitful research strategy in the search of new analgesic and antiinflammatory drugs<sup>1-3</sup>.

*Buchanania lanzan*, family Anacardiaceae, commonly known as Char, Chirauli. It is widely distributed in hot and dry parts of India. The *Buchanania lanzan* is used into an ointment, for skin diseases. In Berar, kernels are pulverized and applied as a remedy for itching. It is used to apply on glandular swellings of the neck. It is believed to cure pimples and prickly heat. It is also employed by women to remove spots and blemishes from the face. The oil extracted from the kernels is used as a substitute for almond oil in native medicinal preparations and confectionery<sup>4,5</sup>. Although it is a popular traditional medicine in Indian subcontinent, literature surveys reveals that anti-inflammatory and antioxidant activity of *Buchanania lanzan* has not yet been documented. Its ethno botanical claim prompted us to undertake this investigation<sup>6</sup>. Current drugs for inflammation such as NSAIDs and opiates are not beneficial in all cases, due to their side effects and potency. Hence search for other alternatives seems necessary and beneficial. Antioxidants help to deal with oxidative stress which is caused by free radical damage. Moreover, several studies suggest that natural anti-inflammatory agents could be beneficial in the prevention and treatment of these pathologies<sup>7-9</sup>. This

study aimed to investigate *in vivo* anti-inflammatory potential of methanolic extracts from *Buchanania lanzan*. Therefore an effort has been made to corroborate and establish scientific evidence for its ethno botanical uses.

### MATERIALS AND METHODS

#### Animals

Female and Male Sprague-Dawley rats weighing 150-250g were used in these experiments. The animals were housed at room temperature (20±2°C) in standard cages with standard pellet food and kept under controlled environment following the standard operating procedures of animal house with the approval of animal ethic committee.

#### Chemicals

Carrageenan (Sigma), acetylsalicylic acid, CMC (Carboxymethyl cellulose) and DMSO (Dimethyl sulfoxide) were obtained from Sigma Aldrich, USA. All the compounds were dissolved in mixture of CMC and DMSO (9:1).

#### Anti-inflammatory activity<sup>10-14</sup>

##### *Carrageenan-induced rat paw oedema*

In this method, rats were divided into seven groups of six each. The animals were pretreated with drug and methanolic extracts in concentration of (ME-10mg/kg, 20mg/kg, 30mg/kg, 40mg/kg, and 50mg/kg) were given by (i.p) route 30 minutes before carrageenan injection (phlogistic agent) of 0.1ml dose (i.p); Carrageenan was injected into the sub plantar tissue of left hind paw of each rat. Swellings of carrageenan-injected foot were measured at 30min, 60min, 120min, 180min using plethysmometer. The right hind paw was injected with 0.1ml of vehicle. The animals received the standard drug



aspirin (20mg/kg, i.p.). This served as reference standard. The data given in Table 1.

The experimental groups were as follows (n=6);

Group 1: control (CMC+DMSO), i.p;

Group2: Acetylsalicylic acid (20mg/kg), i.p;

Group3: ME (10mg/kg), i.p;

Group4: ME (20mg/kg), i.p;

Group5: ME (30mg/kg), i.p;

Group6: ME (40mg/kg), i.p;

Group7: ME (50mg/kg), i.p;

## RESULTS AND DISCUSSION

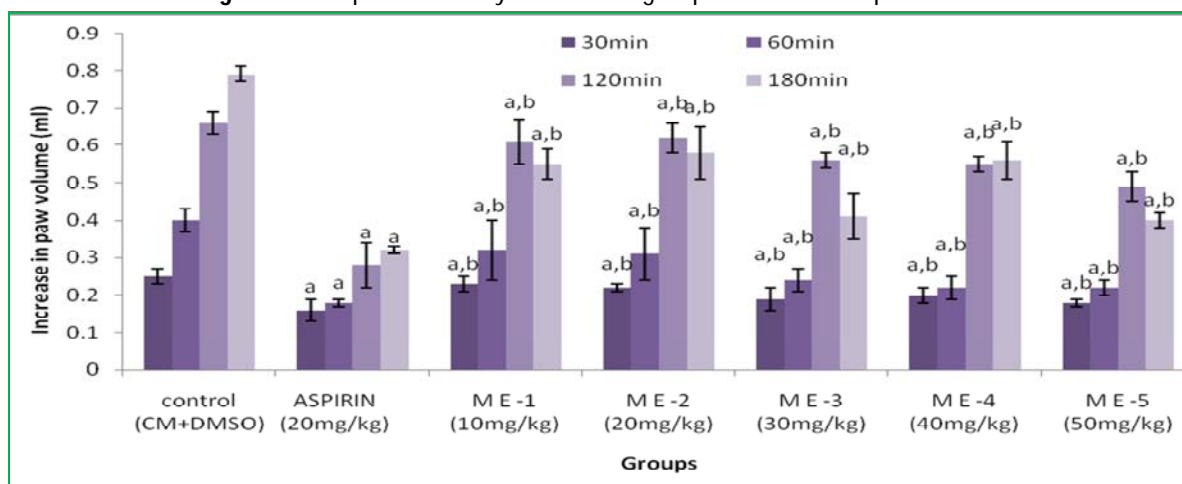
Anti-inflammatory activity of the methanolic extract of *Buchanania Lanzas* leaves were carried out by Carrageenan-induced rat paw oedema method by using plethysmometer. It showed a good anti-inflammatory

activity at 3<sup>rd</sup> hour of treatment which was then compared with standard aspirin at different doses. The reduction of increase edema volume compare with that of aspirin. ME-1(10mg/kg) & ME-2 (20mg/kg) showed the good increase in paw volume (Figure 1). The optimized methanolic extract was ME-4 which has the best anti-inflammatory result (Table 1). Among several traditional claims, the utility of *Buchanania lanzan* in inflammation and pain has been emphasized only in literature. Hence results of present investigations might give scientific authentication to the traditional claims. The computational studies also supports that the compounds having more electron donating potentials are better inhibitors of hydroperoxides which suggests many of the antioxidant agents are found to be effectively exhibit anti-inflammatory activity. Observed results may be due to the presence of phytochemical constituents like polyphenols, saponins, triterpenoids, and glycosides.

**Table 1:** Effect of methanolic extract on paw oedema induced by carrageenan in rats

Treatment	Doses (mg/kg)	½ hr	1 hr	2 hr	3 hr
Control (CMC+DMSO)	–	0.25±0.02	0.40±0.03	0.66±0.03	0.79±0.02
Methanolic extract (ME-1)	10mg/kg	0.23±0.02	0.32±0.08	0.61±0.06	0.55±0.04
Methanolic extract (ME-2)	20mg/kg	0.22±0.01	0.31±0.07	0.62±0.04	0.58±0.07
Methanolic extract (ME-3)	30mg/kg	0.19±0.03	0.24±0.03	0.56±0.02	0.41±0.06
Methanolic extract (ME-4)	40mg/kg	0.20±0.02	0.22±0.03	0.55±0.02	0.56±0.05
Methanolic extract (ME-5)	50mg/kg	0.18±0.01	0.22±0.02	0.49±0.04	0.40±0.02
Aspirin	20mg/kg	0.16±0.03	0.18±0.01	0.28±0.06	0.32±0.01

**Figure 1:** Comparative study of different groups with increase paw volume



<sup>a</sup> p < 0.05 as compared to control group; <sup>ab</sup> p < 0.05 as compared to the reference group; Values are Mean±SEM; n = 6 in each group.

### Statistical analysis

Results were expressed as mean ±S.E.M.

Percentage of inhibition (I %) = [(1-(dt/dc))] x 100.

Where *dt* is the difference in paw volume in drug-treated group and *dc* the difference in paw volume in the control group.

Thus the results from present study indicate the efficacy of the active constituents as a therapeutic agent in acute as well as chronic inflammatory conditions and oxidative stress. Studies are in progress in order to determine *in vivo* antioxidant activity identify and isolate the bioactive Phytoconstituents.



**CONCLUSION**

From the results it could be concluded that the extracts exhibit good anti inflammatory activity which have scientific authentication to the traditional claims.

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